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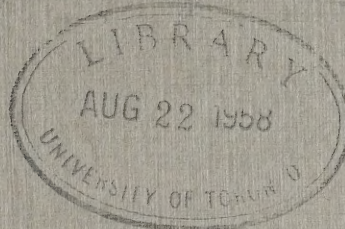
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COPY FOR MR. J. ALLAN ROSS




HYDRO-ELECTRIC INQUIRY COMMISSION

GENERAL REPORT

RIDEAU SYSTEM

JOSEPH H. W. BOWER

SECRETARY



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R I D E A U S Y S T E M

COPY

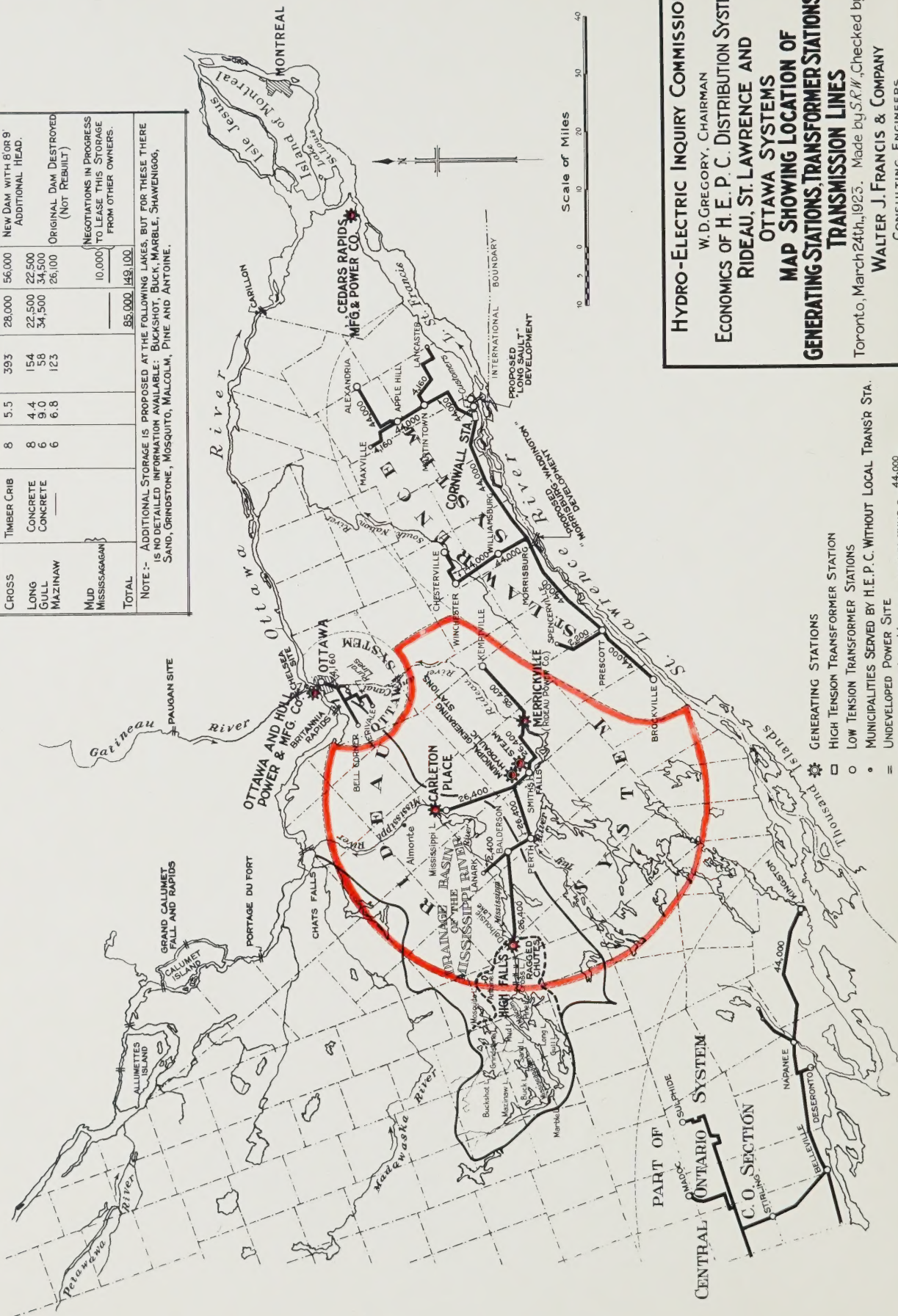
WIDEVIEW SYSTEM

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TABLE OF MISSISSIPPI RIVER STORAGE RESERVOIRS

NAME OF LAKE	DAM TYPE OF CONSTRUCTION	HEAD FEET	WATERSHED LAKE DRAINAGE	STORAGE AREAS: SQ. MILES STORAGE-ACRE-FT.		REMARKS
				PRESENT	FUTURE	
CROSS	TIMBER CRIB	8	5.5	393	28,000	56,000
LONG GULL MAZINAW	CONCRETE	8	4.4	154	22,500	22,500
		6	9.0	58	34,500	34,500
		6	6.8	123	26,100	26,100
MUD MISSISSAGAGAN					10,000	
TOTAL					95,000	149,100

NOTE:- ADDITIONAL STORAGE IS PROPOSED AT THE FOLLOWING LAKES, BUT FOR THESE THERE IS NO DETAILED INFORMATION AVAILABLE: BUCKSHOT, BUCK, MARBLE, SHAWENIGOG, SAND, GRINDSTONE, MOSQUITO, MALCOLM, PINE AND ANTOINE.



HYDRO-ELECTRIC INQUIRY COMMISSION

W. D. GREGORY, CHAIRMAN

ECONOMICS OF H. E. P. C. DISTRIBUTION SYSTEMS

RIDEAU, ST. LAWRENCE AND

OTTAWA SYSTEMS

MAP SHOWING LOCATION OF

GENERATING STATIONS, TRANSFORMER STATIONS AND TRANSMISSION LINES

Toronto, March 24th, 1923. Made by S.R.W., Checked by J.H.W.

WALTER J. FRANCIS & COMPANY

CONSULTING ENGINEERS

GENERATING STATIONS

□ HIGH TENSION TRANSFORMER STATION

○ LOW TENSION TRANSFORMER STATIONS

• MUNICIPALITIES SERVED BY H.E.P.C. WITHOUT LOCAL TRANS. STA.

= UNDEVELOPED POWER SITE

TRANSMISSION LINE VOLTAGE SHOWN THIS ○ 44,000

卷之四

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RIDEAU SYSTEM

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THE EASTERN HANDBOOK

ON THE

RECENT YEARS

1	General
2	General

General

General

General

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Toronto, Ontario,
September 25th,
1923 .

Hydro-Electric Inquiry Commission,
W. D. Gregory, Esq., Chairman,
Toronto, Ontario.

re: General Report - Rideau System

Mr. Chairman and Gentlemen:

In accordance with your instructions, a general report on the Rideau System has been made, along the lines approved of by the Commission on January 2nd. The work has been done under my direct personal supervision as per your instructions.

The reports of Messrs. Price, Waterhouse & Company and Messrs. Clarkson, Gordon & Dilworth, together with the report on this system by the Commission's Consulting Engineer, Mr. W. J. Francis, have been used in the preparation of this report. No public hearing was held in connection with this system.

The report falls naturally into two parts. The first part includes sections entitled "Historical Sketch", "Physical" and "General Economics". These sections are largely a recital of facts. The second part of the report entitled "Summary" is merely intended to direct attention to those points which appear to require special consideration by the Commission.

Particular attention is directed to a subsection of the report entitled "Addenda", which deals with the revision recently made in the reserve for renewals account.

All figures used in this report have been carefully checked by a representative of Messrs. Price, Waterhouse & Company. Reports forming the basis of this report are appended hereto, and in order to facilitate reference to the documents in question, on the right-hand margin of the report throughout will be found abbreviated references.

Yours very truly,

J. W. Brown
Secretary

JHNB/G.

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RIDEAU SYSTEMHISTORICAL SKETCH

The Rideau System, as at present constituted, has resulted from the efforts of the municipalities of Perth, Smith's Falls and Carleton Place, which were desirous of having a source of power which would be adequate to take care of their industrial growth. During the years 1916 and 1917 these municipalities began to negotiate for a supply of power from the Commission. At that time the municipalities in this district, now comprized in the Rideau System, were supplied by small electric power plants which were either municipally owned or were the property of small private companies. A number of these small hydro-electric plants situated on the Mississippi, Rideau and Tay Rivers were very seriously affected by low water periods, and several auxiliary steam plants were required to maintain service. The Rideau Power Company at Merrickville was the only company with sufficient excess capacity to consider the sale of power at any distance from the generating station.

HJ7.
p.4.

The Commission, after investigating the requirements of the district and considering the various possible sources of power supply, apparently came to the conclusion

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1918. The Commission has been authorized to consider the sale of power
at a price from the generating station.

The Committee also investigated the charges against the District and recommended the action taken.

that the best way to supply the municipalities in this district was to develop the power locally, and steps were taken to purchase the privately-owned rights in the undeveloped power site at High Falls on the Mississippi River. The Order-in-Council permitting the purchase was dated July 4th, 1918, and the purchase price was \$10,478.

WJF.
p.5.

During this period, 1917 to 1918, the municipalities of Perth, Smith's Falls and Carleton Place, with the aid of the Commission, entered into negotiations for the purchase of the local power plants from the private companies which owned and operated them.

WJF.
p.5.

COPY
In Perth, after a valuation had been made by the engineers of the Commission, the town took over the remaining two of the three local hydro-electric plants and the steam plant, the distributing systems, and also the water works. In each of the two hydro-electric plants acquired, known as the "Badour" and the "Glen Tay", the 132-cycle generators were later replaced by the installation of one 200-kilowatt, 3-phase, 60-cycle, 2,200-volt generator, and the steam-electric plant was discarded. The third local hydro-electric plant was already owned by the municipality and was used for street lighting only.

WJF.
p.5.

In Smith's Falls, the plants and distributing systems of the Smith's Falls Electric Company and the Citizens Electric Company were taken over by the municipality and

that the best way to supply the municipalities in this district was to develop the power plants and steps were taken to purchase the hydroelectric plants in the municipalities owned by the State of New York. The hydroelectric plants owned by the State of New York were sold to the municipalities in 1915, 1916, 1917 and 1918. The municipalities of New York, which have been mentioned above, with the aid of the Commission, entered into agreements for the purchase of the local power plants from the private companies which owned and operated them.

In 1920, after a valuation had been made by the Commission of the municipalities, the same year, the Commission and the three local hydroelectric plants and the three plants, the hydroelectric systems, and also the water works. In each of the three hydroelectric plants mentioned as the "Lockport", and the "Genesee", the hydroelectric plants were later replaced by the installation of one hydroelectric plant, 2,000-horsepower, 1,000-horsepower, and the hydroelectric plant was destroyed. The three local hydroelectric plants are shown in the following table and was the first step.

In 1921, the plants and equipment owned by the State of New York, which have been mentioned above, were sold to the municipalities and

100.

100.

100.

operated as a self-contained system until a supply of power was obtained from the Commission. These plants are equipped with 60-cycle generators and can be operated in parallel with the rest of the system.

WJF.
p.6.

On January 25th, 1918, the Commission entered into an agreement with the Rideau Power Company, Limited, at Merrickville, for the purchase of a supply of power. The plant was stated to have a capacity of 1000 horse-power, and the Commission agreed to purchase a minimum of 500 horse-power for 20 years at \$14.00 per horse-power per annum; the quantity of power to be increased, if required, until the ultimate supply reached the total available capacity of the plant after first supplying the requirements of the municipality of Merrickville, which also purchases power direct from the company.

WJF.
p.6.

Since the autumn of 1918 the Commission has been supplied with some power from this company, the amounts averaging 669 horse-power in 1919, 479 horse-power in 1920, 363 horse-power in 1921, and about 400 horse-power in 1922. As the company could not fulfil its obligations to supply a minimum of 500 horse-power after providing for the Merrickville requirements, the Commission did not pay for the full 500 horse-power, but only for the amount actually taken as above.

WJF.
p.6.

In 1918 the municipality of Carleton Place secured an option for the purchase of the local hydro-

...with the rest of the system.

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p. 10

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electric power plant on the Mississippi River at the outlet of Mississippi Lake, and the distributing system, both of which were owned and operated by H. Brown & Sons. These properties were purchased by the municipality on May 1st, 1919, and the power plant was taken over on May 20th, 1919, by the Commission to be used as an extra source of supply for the municipalities of the Rideau System, and to give control of the river at Carleton Place.

WJF.
p.7.

Pending the development of High Falls, which was built between October, 1918, and June, 1920, power was obtained by the Commission from the Rideau Power Company at Merrickville, under the contract already mentioned, to serve the municipalities of the Rideau System. A 26,400-volt transmission line between the generating station at Merrickville and Smith's Falls was constructed, being tested and put into service on September 15th, 1918, and the town of Smith's Falls was supplied with power from that date. This marked the beginning of the operation of the Rideau System. In April, 1918, work was started on a transmission line from Smith's Falls to Perth, and on February 16th, 1919, Perth began to take power from the Commission. In 1918 a line was constructed from Perth to High Falls, a distance of twenty-one miles, this line being at first used to transmit power from the Merrickville generating station to High Falls for construction purposes and later to carry power from the High Falls plant to the

Rideau System. On May 1st, 1919, the municipality of Carleton Place took possession of the above-mentioned generating and distributing system then owned and operated by H. Brown & Sons. The Commission arranged with the municipality of Carleton Place that the municipality should retain the distributing system and that the Commission should take over the generating plant for \$60,000.00. An Order-in-Council dated May 20th, 1919, authorized the Commission to purchase this plant, which, as already stated, is located on the Mississippi River just below Mississippi Lake and has a capacity of about 550 horse-power at 80 per cent. power factor.

WJP.
p.8.

When this hydro-electric plant was purchased by the Commission, the municipality of Carleton Place became a partner in the Rideau System and was supplied with the full capacity of the development. A transmission line was constructed during the summer of 1919 from Carleton Place to High Falls and completed the connection between the development at Carleton Place and the Rideau Power Company's plant at Merrickville.

WJP.
p.8.

On May 1st, 1920, the first unit of the High Falls development was put into service, and on June 26th the two other units were made available, making the rated capacity of this plant 2,800 electrical horse-power at 80 per cent. power factor.

WJP.
p.9.

During the latter part of 1919 and the early

part of 1920 the municipalities of Smith's Falls and Perth were greatly handicapped by the shortage of power at Merrickville due to lack of water in the Rideau Canal. This necessitated the temporary operation of the steam plant at Smith's Falls, resulting in a large increase in operating expenses. The shortage was relieved when the first unit at High Falls was put into service on May 1st, 1920.

WJF.
p.9.

At October 31st, 1921, the Commission was supplying power to four municipalities, namely, Carleton Place, Smith's Falls, Perth and Lanark, the latter being served by a 2,400-volt line from the distributing station in the village of Balderson through which the 26,400-volt line between Perth and High Falls passes. Since October, 1921, the system has continued to expand, a rural class distributing station having been constructed to supply the village of Kemptville, the village of Balderson being supplied from the Balderson station. On March 1st, 1922, the Commission agreed to supply the Grenville Crushed Rock Company, Limited, of the town of Smith's Falls, with 650 electrical horse-power at \$45.00 per horse-power per annum for a period of four years from April 1st, 1922. This agreement may be extended for further terms of one year each, upon the mutual agreement of both parties.

WJF.
p.9.

During the winter of 1922-1923 extreme low water conditions have existed on the Mississippi River, resulting in a shortage of several hundred horse-power at the High Falls plant and at Merrickville. This made it necessary to operate the hydro-electric plant at Carleton Place and one of the municipal plants at Smith's Falls.

RECOMMENDATION OF THE COMMISSION

To prevent the recurrence of such shortage of power at the High Falls plant, the Commission proposes that additions to and improvements in the water storage be made by building new dams at the lakes at the headwaters of the Mississippi River during the year 1923.

WJF.
p.10

PHYSICAL

The Rideau System lies north and west of the St. Lawrence System and south and west of the Ottawa System. It extends about fifty miles north and south, and fifty miles east and west, and includes within its boundaries the County of Lanark and parts of the Counties of Grenville, Leeds, Frontenac, Renfrew and Carleton.

WJF.
p.10

Speaking broadly, the Rideau System consists of one 2,800 horse-power hydro-electric generating plant on the Mississippi River at High Falls, one 530 horse-power generating station on the same river at Carleton Place, together with transmission lines feeding six municipalities and one company. A certain amount of rural load will probably be supplied in the near future.

WJF.
p.11Generating Stations
and Other Sources of Power Supply(a) High Falls Plant

The High Falls plant, developed by the Commission, is the largest generating station on the system. It is located on the Mississippi River in the southern part of Lanark County, about twenty-five miles north-east of Perth and one-half mile above Dalhousie Lake. The watershed area of the Mississippi above this site is about 450 square miles.

The Construction Department of the Commission, which handled the whole of the development, built a concrete dam about 510 feet long and 25 feet maximum height across the head of the falls, providing a local pondage of about 300,000,000 cubic feet available for daily peak operation. An intake channel, about 8 feet wide at the bottom, extending for a distance of 247 feet upstream from the gate-house section at the north end of the dam, has been excavated. The gate-house substructure, which is built as part of the dam is 27 feet wide by 30 feet long, and has a height of 22 feet to the bottom of the superstructure. Its water section narrows down to a reinforced concrete elbow 10 feet in diameter, which connects to a continuous wood-stave pipe of the same size. The water is led through this pipe a distance of 320 feet to the turbines which operate at a mean net head of 78 feet and a minimum net head of 76 feet. The gross head is about 81.5 feet. The power house, situated on the river bank, is about 94 feet long by 62 feet wide, and is built entirely of concrete. The three horizontal, double-runner, double discharge turbines were purchased at a low cost from the Hannawa Falls Power Company of Potsdam, New York, and were built by the James Leffel Company at Springfield, Mass. They are rated at 1,200 horse-power each at 300 revolutions per minute under a head of 80 feet.

The investigation report of the Commission, which included
the study of the investigation, while a contract has been
his last year and is last summer before the last
of the last, providing a last contract of about 100,000,000
which last available for early year operation. The last
amount, about 5 feet wide of the bottom, extending for a
distance of 100 feet square from the east-west section
of the river and at the end, 100 feet square. The last
some water, which is still at the end of the last
10 feet wide of 10 feet long, and has a depth of 10 feet
in the bottom of the waterway. The water section
between the last and the last is about 10 feet in
distance, which section is a minimum water-way pipe
of the same size. The water is fed through this pipe a
distance of 100 feet to the bottom which section is a
small and small at 10 feet and a minimum and small at 10
feet. The water level is about 10 feet. The water level
estimated at the river level is about 10 feet long of 10
feet wide and is still existing at present. The water
horizontal, which section, which section section was
proposed as a low level from the bottom level town
length of 100 feet, 100 feet, and was still at the last
last length of 100 feet, 100 feet. They are rated as
1,100 horse-power and 100 feet section has been rated
a level of 10 feet.

One of the units is coupled to one 875-K.V.A., 3-phase, 60-cycle, 4,160-volt horizontal generator; and the other two units are each coupled to two 350-K.V.A., 3-phase, 60-cycle, 4,160-volt horizontal generators, these being directly connected to opposite ends of the same turbine shaft, these machines having been purchased with the turbines. Three 750-K.V.A., station transformers step up the voltage from 4,160 to 25,400 volts for transmission to the distributing stations at Balderson, Carleton Place, Kemtville, Perth and Smith's Falls.

The capacity of this plant is approximately 2,800 electrical **COPY** horsepower at 80 per cent. power factor in accordance with the ordinary rating of the Commission. It is stated that it requires about 540 cubic feet of water per second when operating at maximum peak capacity.

WJF.
p.11
& 13.

(b) Carleton Place Plant

Besides the High Falls plant the Rideau System includes a hydro-electric power development located on the same river, the Mississippi, at Carleton Place. This plant is owned by the Commission and is maintained as a standby. A dam 400 feet long and varying in height from 3 feet to 12 feet impounds the water over an area stated to be approximately 10 square miles. The water is led from the dam by means of four open penstocks each 14½ feet wide and 24 feet long to the power house. The mean head at the turbines is 10.5 feet

and the minimum head 9 feet. The hydraulic equipment consists of three Sanson Leffel vertical turbines each of about 280 horse-power capacity, connected by crown gears to one horizontal shaft. Two horizontal generators, one of 250 K.W. and the other of 150 K.W. capacity are belted to this shaft. These generators are both 3-phase, 60-cycle, 600 revolutions per minute, 2,200 volt machines built by the Canadian General Electric Company. Three 250-K.V.A., station transformers step up the voltage from 2,200 volts to 26,400 volts, for transmission over the lines of the system.

This plant, which has recently been entirely overhauled and readjusted, has a capacity of approximately 535 electrical horse-power at 80% power factor in accordance with the rating of the Commission.

WJP.
p.14.

(c) Storage Reservoirs

At Cross, Gull, Long and Mazinaw Lakes, at the headwaters of the Mississippi, water storage of 2,620,000,000 cubic feet has been developed by the Mississippi Improvement Company, by means of rock filled, timber crib dams, and it is stated by the engineers of the Commission that this storage can be materially increased by further conservation works at Mud, Mississagagon, Kashwahanah, Buckshot and Grindstone Lakes. The storage is operated by the Mississippi Improvement Company, a private company which was formed by

and the minimum band 5 foot. The respective equipment was
 rated at three hundred (300) watts and at three
 250 watt-power respectively, mounted by seven feet in the
 horizontal plane. The horizontal distance, was at 200
 2.5 and the other at 150 K.W. respectively the signal is
 this signal. These components are with 50-watt, 50-watt
 500 watt-power per minute, 2,500 watt maximum signal of
 the horizontal General Electric Company. Three 250-K.W. 2.5
 station transmitter step up the voltage from 2,500 volts
 to 25,000 volts. The transmission over the line of the
 system.

This signal after has received from station
 evaluated and transmitted, has a capacity of approximately
 500 electrical watt-power at 500 watt power is maintained
 with the station of the transmission.

(2) WIRELESS TRANSMISSION

At three, four, five and ten foot, at the
 frequency of the electrical, under voltage of 2,500, 500, 100
 signal that has been developed by the electrical transmission
 system, in order to test filled, filled with sand, and is
 in place of the equipment of the transmitter that this
 change can be relatively increased by further communication
 parts of the, transmission, transmission, distance and signal
 state signal. The signal is operated by the electrical
 improvement system, a private company which was formed by

100-
 0-10

the power site owners downstream, the expenses of operation being met by the power users, including the Commission.

WJF.
p.15.

(d) Merrickville Plant - Rideau Power Company

The only other generating station supplying power to the lines of the system is located on the Rideau River at Merrickville, and is owned and operated by the Rideau Power Company, Limited. This company supplies power to the system under a ten-year contract. The generating station has an installed capacity of one 1,750 horse-power turbine coupled to a 562-K.V.A., 3-phase, 60-cycle, 600-volt generator. Serious power shortages have occurred at this plant for protracted periods due to the operation of the Rideau Canal. Power is delivered to the Rideau System from this plant through the transformer station at Merrickville, which has a capacity of 750 K.V.A., and steps up the voltage from 600 to 26,400 volts for transmission to the lines of the system.

WJF.
p.15

Undeveloped Power Sites

On the Mississippi River about four miles upstream from the High Falls plant, commences a series of four rapids known respectively as Ragged Chutes, 39 feet head; Island Rapids, 30 feet head; Otter Rapids, 15 feet head; and King Rapids, 24 feet head. These four rapids aggregate about 116 feet total head, and reconnaissance surveys made by the Commission indicate that an economical

development may be made by taking in at least seventy-seven feet and possibly the whole available head. Such a development would be somewhat similar to that at High Falls and would have the benefit of the same storage. A plant of 3,000 to 4,000 horse-power might possibly be installed at this site if the storage said to be possible be fully utilized, and the local constructional conditions prove feasible and economical, upon further investigation.

The drainage area above this site is about 450 square miles, the minimum precipitation is said to be 31.5 inches, and the average 35 inches per annum. The minimum monthly run-off of the river is given as 96 cubic feet per second with a yearly average of 513 cubic feet per second. These figures are based on precipitation records from 1915 and on gaugings from the year 1919.

WJF.
p.16

Miscellaneous Power Plants

There are ten small power plants within the boundaries of the territory included in the system, besides the two owned by the Commission. Of the ten, one is owned by an industrial company to develop energy for its own requirements and the other plants were originally developed to serve as public utilities. At the present time, the Rideau Power Company, Limited, Merrickville, and the two plants in the municipality of Almonte are the only ones generating power for public consumption, besides these of

...and the local environmental conditions have
...and the local environmental conditions have
...and the local environmental conditions have

and on drawings from the year 1933.

There are two small power plants which are operated at the factory located in the system, between the two ends of the line. At the end of the line, by an isolated company, a power plant is now being constructed and the other plant was originally designed to serve as a backup station. At the present time, the Edison Power Company, Limited, Montreal, and the two plants in the vicinity of Montreal are the only ones connected with the public system. During the year of

the Commission. The remaining plants are idle, but are available for emergencies.

WJP.
p.17

A table of miscellaneous power plants in the district is given on page 17 of our Consulting Engineer's report.

Transmission Lines

Up to October 31st, 1922, the Commission had constructed a total of 76.65 miles of high voltage transmission lines, forming a 26,400-volt network supplying the various municipalities. One district is supplied by means of a 2,300-volt line from the Balderson distributing station, a distance of 4.97 miles.

The transmission system is constructed on wooden poles throughout and presents no extraordinary features.

WJP.
p.16

Transforming & Distributing Stations

The transmission lines feed the various municipalities at low voltage through five substations. Each of these stations supplies only one municipality, with the exception of that at Balderson. This station supplies Lanark as well as the Village of Balderson.

In view of the fact that no power is developed by the St. Lawrence System and there is and may be a surplus of energy available from the Rideau System, and also because power may be purchased in quantity on the St. Lawrence System,

b2X
b7C

the Commission. The Commission plans to visit the
 facilities for investigation.
 A visit of the Commission to the
 station is being planned for the Commission's
 report.

Transmission Lines

Up to October 1954, the Commission had
 constructed a total of 10.4 miles of high voltage trans-
 mission lines, totaling a 21,400-volt capacity.
 The system consists of two circuits in parallel at
 each of 2,300-volt lines from the station supplying
 station, a station at 2,300-volt.

COPY

The transmission system is constructed on
 wooden poles, insulators and conductors are aluminum.
 Insulators.

b2X
b7C

Transmission and Distribution

The transmission lines feed the various substations
 located at the village through the substations. Each
 of these substations supplies only one substation. With the
 exception of that at the station, this station supplies power
 as well as the Village of Balabon.
 In view of the fact that no power is developed by
 the 21,400-volt system and there is no way to a supply of
 energy available from the 21,400-volt system, and since the
 power may be generated in quantity on the 21,400-volt system.

provision has been made for the future inter-connection of these systems. The distributing equipment of the five stations of the system has all been designed to change the transmission of power from 26,400 volts as at present to 44,000 volts, being the voltage of the receiving stations of the St. Lawrence System.

WJF.
p.18

A table of transforming and distributing stations is given on page 19 of our Consulting Engineer's report.

Local Distributing Systems

There are no municipalities on the system in which the Commission distributes retail power to the consumers. The Commission acts as a wholesale distributor only and in all the municipalities the electricity is distributed by the municipality itself or by local commissions in the municipalities. It is understood that the accounting for all of the municipalities of the system is done in accordance with the standard accounting system of the Commission, and the details for the various municipalities are given in the Annual Reports.

WJF.
p.19

A map showing location of generating stations, transformer stations and transmission lines forms the frontispiece of this report.

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CONFIDENTIAL

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CONFIDENTIAL

provision has been made for the future inter-connection of
these systems. The first group of systems of the type
described in the report has all been designed to connect
the transmission of power from 10,000 volts to 22,000
volts, being the voltage of the receiving stations
of the 10,000 volt system.

A table of transforming and distributing
stations is given on page 17 of the Confidential Engineer's
report.

Local Distribution System

There are two main policies on the system in
which the demand on distribution system is not too
heavy. The first policy is a local distribution
only and in all the municipalities the electricity is
distributed by the municipality itself or by local com-
mission in the municipality. It is understood that
the responsibility for all of the municipalities of the
system is now in accordance with the standard distribution
system of the Government, and the details for the system
municipalities are given in the Confidential Engineer's
report.

A copy of the Confidential Engineer's report
transmission system and transmission lines forms the
basis of this report.

GENERAL ECONOMICSCapital Investment

Under authority of Order-in-Council dated July 4th, 1918, the Commission purchased the privately owned rights in the undeveloped power site on the Mississippi River, together with certain lands for \$10,478.00. The Order-in-Council empowered the Commission:

1. To acquire by purchase or lease or otherwise the necessary lands, waters, water privileges and water powers for the developing of the said water power.
2. To purchase the necessary material and equipment for construction of plant for generation of 3,000 horse-power of electrical energy and for its transformation for transmission to the various municipalities in that district.
3. To purchase the necessary material and equipment for the construction of transmission lines and transformer stations for the delivery of the said power to the various municipalities in that district.

The construction of a power development on this site was commenced in 1918 and completed in May 1920. It is commonly known as the "High Falls Power Development".

In 1919, under authority conferred by Order-in-Council dated May 20th, 1919, the Commission purchased for \$60,000.00 from the town of Carleton Place a power plant on the Mississippi River, consisting in the main of a dam, buildings, machinery, etc., together with a tract of land, and seventy-five shares of capital stock of a par value of

H.J.P.
p.5.P.W.
p.3.P.W.
p.3.P.W.
p.6.

GENERAL INFORMATION

General Information

Power authorized by Congress to develop water power

In 1918, the Commission purchased the rights to develop

in the Mississippi River, and

power with certain lands in the State of

which included the Commission

2. To acquire by purchase or lease or otherwise
the necessary lands, water, water rights
and other powers for the development of the
said water power.

3. To provide for the necessary material and design
and the construction of plant for generation
of electric power or electrical energy and
for its transmission for transmission to the
various municipalities in that district.

4. To purchase the necessary material and design
and the construction of transmission lines
and power stations for the delivery of
the said power to the various municipalities in
that district.

The construction of a power development on this

site was commenced in 1918 and completed in 1920.

It is hereby known that the said power development

is hereby authorized to be developed by the

Commission dated May 22nd, 1918, the Commission purchased the

rights to develop the power of the said river and

the Mississippi River, situated in the State of

Mississippi, and to develop with a view to

the development of electric power at a point on

1918
1920

1918
1920

1918
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1920

\$100 each of the Mississippi River Improvement Company, Limited, on which \$4,125.00 had been paid representing assessments to that date against the shareholders. The Commission did not take up on its books a separate valuation of this capital stock due to the uncertain value thereof. Further information relative to the Mississippi River Improvement Company is given on Exhibit V of Messrs. Price, Waterhouse & Company's report on the Rideau System dated November 7th, 1922.

The investment in the plant, equipment, etc., of the Rideau System for the four years ending October 31st, 1921, is as follows:

	Year ending October 31st,				
	1918	1919	1920	1921	
Power Development	\$ 30,955	\$430,516	\$746,941	\$756,285	P.W.
Wood Pole Lines	103,469	218,717	233,602	260,654	p.8
Transformer Stations	17,174	32,234	49,844	57,065	
T o t a l	\$151,598	\$681,467	\$1,032,387	\$1,074,004	

The investment of \$756,285 in the power developments is represented by:

High Falls Development	\$695,414	N.J.F.
Carleton Place Development	60,871	p.26
	<u>\$756,285</u>	

1200 East of the Mississippi River, Louisiana, 70001

[illegible]

with a maximum of 1000 iterations and a tolerance of 0.0001.

DECLASSIFIED AUTHORITY: 688010101 AND 688010102 DATE: 03-28-2013 BY: 60322 JAL/ALB/STP

At this meeting, I met with the University of the Pacific.

— 100 —

...with a view to a full-scale investigation of the ...

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Yours very truly,
John A. S. [Signature]

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The investment is 17.1% of the company's assets.

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电话：010-63001111

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In a letter dated June 26th, 1918, addressed to Sir William Hearst by the Chairman of the Commission is contained the following information regarding the estimated cost of the High Falls Development:

"The work contemplated consists of the complete development of the High Falls for 3000 horse-power, and 22 miles of high tension line to Perth at a total estimated cost of \$340,000."

It will therefore be noted that the actual cost exceeded the estimate by more than 100%.

The following indicates the capital cost per rated plant horse-power developed at October 31st, 1921:

Power Development	\$226.77
Transmission Lines	78.76
Transforming and Distributing Stations	17.11
	<u>\$322.64</u>

WJF.
p.32

In addition to the horse-power generated by the Commission, a considerable amount is purchased from the Rideau Power Company, Limited. For purposes of comparison the following table is submitted showing the capital cost per plant horse-power developed plus power purchased:

	1919	1920	1921
Power Development	\$357.50	\$196.30	\$204.50
Transmission Lines	181.70	61.30	70.40
Transforming and Distributing Stations	26.80	13.10	15.50
Total -	<u>\$566.00</u>	<u>\$270.70</u>	<u>\$290.40</u>

WJF.
p.32

In a letter dated June 28, 1951, submitted to the
 Finance Board by the Chairman of the Commission is contained
 the following information regarding the estimated cost of the
 High Voltage Project:

"The work contemplated consists of the design,
 development of the High Voltage Test Room
 power, and its use to test the machine line at
 700 kV as a final estimated cost of \$250,000."

It will therefore be noted that the actual cost

exceeded the estimate by more than 100%.

The following indicates the capital cost per test

High Voltage Project as reported in letter dated July, 1951:

High Voltage Project	\$250,000
Estimated cost	70,000
Actual cost	180,000
Excess cost	\$110,000

100%
 150%

It would be seen that the actual cost per test

exceeded the estimate by more than 100%.

These figures, however, are not comparable with the

following table as reported in the report dated July, 1951:

Estimated cost per test as reported in the report dated July, 1951:

1951	1952	1953	1954
\$250,000	\$250,000	\$250,000	\$250,000
\$70,000	\$70,000	\$70,000	\$70,000
\$180,000	\$180,000	\$180,000	\$180,000
\$110,000	\$110,000	\$110,000	\$110,000

100%
 150%

The expenditures on the Rideau System were made out of moneys advanced by the Province of Ontario and the following is a comparison of the advances by the Province with expenditures of the Commission by years:

Period	Advances by Province	Expenditures by Commission	Unexpended Overexpended	
Year Ending October 31st,				
1918	\$107,945.00	\$151,598.61	\$43,653.61	
1919	500,000.00	529,868.37	29,868.37	P.W.
1920	363,000.00	350,920.94	\$12,079.06	p.8.
1921	42,416.07	41,616.53	799.54	
Total -	\$1,013,361.07	\$1,074,004.45	\$60,643.38	

COPY

The funds to meet the expenditures, made by the Commission, in excess of the sums advanced by the Province were obtained from advances made for the purposes of other systems.

As at October 31st, 1921, the engineers of the Commission estimated that additional funds of \$100,000.00 and of \$20,000.00 respectively will be required for the Rideau System during the fiscal years 1922 and 1923 to complete minor extensions and betterments at High Falls and other stations in the system, together with expenditures on account of rural distribution. If these expenditures are carried out, the total investment in the Rideau System at the close of the fiscal year 1923 will be approximately \$1,194,000.00.

P.W.
p.9.

The undersigned on the 11th day of May 1944
at Chicago Illinois by the President of the Board and the following
is a copy of the minutes of the Board and the undersigned

[illegible]

105

The Board is now in the process of reviewing the results of the study and will report to the Commission in due season. It is expected that the Commission will be able to make a final decision on the proposed project in the near future.

Reserve for Renewals

The balance in the reserve for renewals at October 31st, 1921, amounted to \$38,365.47.

During the period from the commencement of operations in 1918 to October 31st, 1920, the additions to the reserve for renewals in respect of properties of the Rideau System were provided through the inclusion in the cost of power to the municipalities of an annual charge of 2.25% on the capital investment. Interest at the rate of 4% per annum on the balance in the reserve account has been credited to that account.

P.W.
p.12

On the recommendation of its engineers, the Commission commencing in the fiscal year 1921 reduced the annual renewal rate from 2.25% to 1.85% on the total capital investment while the interest rate of 4% remained unchanged. The accounts of the Commission were so adjusted that the rate of 1.85% was made effective from 1918 to October 31st, 1920, and the same rate obtained to October 31st, 1921. The amount of the adjustment by years is as follows:

Particulars	1919	1920	Together
Reduction in annual provision	\$749.37	\$2,578.75	\$3,328.12
Reduction in interest thereon	-	29.98	29.98
T o t a l -	\$749.37	\$2,608.73	\$3,358.10

P.W.
p.12

REPORT ON THE RESULTS

The balance in the Treasury for the year 1960 is

Estimated at \$11,000,000,000.

During the period from the commencement of the

year in 1960 to the end of 1960, the balance in the

account for the year 1960 is estimated at \$11,000,000,000.

There is a balance in the account for the year 1960 of

\$11,000,000,000.

Interest on the debt of the year 1960 is estimated at

\$1,000,000,000.

On the assumption of the year 1960, the

balance in the account for the year 1960 is estimated at

\$11,000,000,000.

There is a balance in the account for the year 1960 of

\$11,000,000,000.

Interest on the debt of the year 1960 is estimated at

\$1,000,000,000.

On the assumption of the year 1960, the

balance in the account for the year 1960 is estimated at

\$11,000,000,000.

There is a balance in the account for the year 1960 of

\$11,000,000,000.

Interest on the debt of the year 1960 is estimated at

\$1,000,000,000.

On the assumption of the year 1960, the

balance in the account for the year 1960 is estimated at

\$11,000,000,000.

The balance of \$38,365.47 in the reserve account after giving effect to the aforementioned reduction comprises the following:

Particulars	Provision	Interest	Together
1918 to Oct. 31, 1919 (part year)	\$3,465.85	-	\$3,465.85
Fiscal year ending Oct. 31st,			
1920	11,926.83	\$138.62	12,065.45
1921	19,197.81	621.25	19,819.06
Together	\$34,590.49	\$759.87	\$35,350.36
Add - Reserve applicable to equipment transferred to the system		\$2,967.75	
Interest applicable thereto		154.87	5,122.62
			\$38,472.98
Deduct - Sundry Charges			107.51
			\$38,365.47

P.W.
p.12

The annual rate of 1.85% was determined by a re-classification of the properties as reflected in the book accounts, as at October 31st, 1920, made by the Engineering Department of the Commission. The actual rate arrived at was 1.846% while 1.85% was adopted as a matter of accounting convenience. In arriving at the above mentioned rate, clerical errors in the computation thereof were made. The rate should have been 1.228% instead of 1.846%, a difference of .618%.

P.W.
p.13

It is understood that it is the practice of the Commission to spend sufficient money on maintenance account each year so as to keep each and every portion of the system

The balance of \$25,000.00 is the reserve account
 other thing effect is the increased production compared the
 following

Production	Investment	Capital	Profit
1930	11,000.00	11,000.00	11,000.00
1931	11,000.00	11,000.00	11,000.00
1932	11,000.00	11,000.00	11,000.00
1933	11,000.00	11,000.00	11,000.00
1934	11,000.00	11,000.00	11,000.00
1935	11,000.00	11,000.00	11,000.00
1936	11,000.00	11,000.00	11,000.00
1937	11,000.00	11,000.00	11,000.00
1938	11,000.00	11,000.00	11,000.00
1939	11,000.00	11,000.00	11,000.00
1940	11,000.00	11,000.00	11,000.00
1941	11,000.00	11,000.00	11,000.00
1942	11,000.00	11,000.00	11,000.00
1943	11,000.00	11,000.00	11,000.00
1944	11,000.00	11,000.00	11,000.00
1945	11,000.00	11,000.00	11,000.00
1946	11,000.00	11,000.00	11,000.00
1947	11,000.00	11,000.00	11,000.00
1948	11,000.00	11,000.00	11,000.00
1949	11,000.00	11,000.00	11,000.00
1950	11,000.00	11,000.00	11,000.00
1951	11,000.00	11,000.00	11,000.00
1952	11,000.00	11,000.00	11,000.00
1953	11,000.00	11,000.00	11,000.00
1954	11,000.00	11,000.00	11,000.00
1955	11,000.00	11,000.00	11,000.00
1956	11,000.00	11,000.00	11,000.00
1957	11,000.00	11,000.00	11,000.00
1958	11,000.00	11,000.00	11,000.00
1959	11,000.00	11,000.00	11,000.00
1960	11,000.00	11,000.00	11,000.00
1961	11,000.00	11,000.00	11,000.00
1962	11,000.00	11,000.00	11,000.00
1963	11,000.00	11,000.00	11,000.00
1964	11,000.00	11,000.00	11,000.00
1965	11,000.00	11,000.00	11,000.00
1966	11,000.00	11,000.00	11,000.00
1967	11,000.00	11,000.00	11,000.00
1968	11,000.00	11,000.00	11,000.00
1969	11,000.00	11,000.00	11,000.00
1970	11,000.00	11,000.00	11,000.00
1971	11,000.00	11,000.00	11,000.00
1972	11,000.00	11,000.00	11,000.00
1973	11,000.00	11,000.00	11,000.00
1974	11,000.00	11,000.00	11,000.00
1975	11,000.00	11,000.00	11,000.00
1976	11,000.00	11,000.00	11,000.00
1977	11,000.00	11,000.00	11,000.00
1978	11,000.00	11,000.00	11,000.00
1979	11,000.00	11,000.00	11,000.00
1980	11,000.00	11,000.00	11,000.00
1981	11,000.00	11,000.00	11,000.00
1982	11,000.00	11,000.00	11,000.00
1983	11,000.00	11,000.00	11,000.00
1984	11,000.00	11,000.00	11,000.00
1985	11,000.00	11,000.00	11,000.00
1986	11,000.00	11,000.00	11,000.00
1987	11,000.00	11,000.00	11,000.00
1988	11,000.00	11,000.00	11,000.00
1989	11,000.00	11,000.00	11,000.00
1990	11,000.00	11,000.00	11,000.00
1991	11,000.00	11,000.00	11,000.00
1992	11,000.00	11,000.00	11,000.00
1993	11,000.00	11,000.00	11,000.00
1994	11,000.00	11,000.00	11,000.00
1995	11,000.00	11,000.00	11,000.00
1996	11,000.00	11,000.00	11,000.00
1997	11,000.00	11,000.00	11,000.00
1998	11,000.00	11,000.00	11,000.00
1999	11,000.00	11,000.00	11,000.00
2000	11,000.00	11,000.00	11,000.00

COPY

The annual rate of 1.8% was determined by a re-
 classification of the properties as reflected in the year
 1930, as of January 1, 1930, made by the Department
 of the Interior. The actual rate applied to the
 1.8% rate was adopted as a matter of accounting and
 valuation. It applied to the value estimated for 1930
 and to the estimated value for 1931. The rate applied
 have been 1.8% instead of 1.8%, a difference of 0.01%.
 It is understood that in the position of the
 Commission to spend additional money on maintenance and
 each year as it is necessary and every portion of the system

7.7
 11.0

7.7
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in a condition to operate in accordance with the requirements of economical production, which it is stated is considered to be about 75 per cent. as good as its original new condition. This being so, it is considered that the renewal account should be applied to only 25% of the capital concerned.

WJF.
p.43

At the present time, the total depreciable capital is probably between \$800,000 and \$900,000 while the reserve for renewals to the end of 1921 was about \$38,000. As a large portion of the total depreciable capital has been invested within the past three years, our Consulting Engineer expresses the opinion that the present total accumulations of the fund as applicable to 25 per cent. of the depreciable capital is somewhat larger than is necessary.

WJF.
p.44

Reserve for Sinking Fund

As the Rideau System has not served any municipality with electrical energy for a period of five years, no payments have been made in respect of sinking fund in accordance with the provision of Section 23 of the Power Commission Act.

Reserve for Contingencies

The reserve for contingencies as at October 31st, 1921, amounted to \$1,183.31. This reserve has been established by the Commission under authority of Section 14b of the Power Commission Act for the purpose of providing for special losses or expenses, not arising at regular intervals and not wholly

[illegible]

1917, vol. 11, no. 1, p. 10

As the United States has not received any notification
relating to the situation in the country of the United States,
payments have been made in respect of which the
concerns with the provision of goods to the United States.

Journal of Management Education 30(6)p.789-804

The records for 1971 are as follows:

applicable to the period in which incurred. The balance in P.W.
the reserve as mentioned above consists of the following: p.14

Annual Provision

Year ending October 31st, 1919	\$207.70
1920	409.38
1921	532.90

\$1,149.98

Add - Interest credited
at 4% per annum

33.33

Total - \$1,183.31

In view of the heavy losses which might be occasioned through catastrophe, our Consulting Engineer expresses the opinion that the reserve should be augmented by increasing the annual allowance, and when the reserve of say \$15,000 or \$20,000 will have been built up the rates can be adjusted to suit conditions found after several further years of experience. WJP.
p.45

Accounts with Municipalities

Accounts with municipalities are divided by the Commission in the main as follows:

(a) Power Accounts Receivable

(b) Due by or to municipalities in respect of the cost of power furnished them as determined under the Power Commission Act.

P.W.
p.15.

(a) Power Accounts Receivable

The balance in power accounts receivable at October 31st, 1921, amounted to \$48,272.20. These accounts represent unpaid balances in respect of interim power bills which are paid currently by the municipalities. At September 20th,

THE TWENTY-THREE MONTHS' REPORT OF THE

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in view of the heavy losses which must be sustained through the war, the Government should be authorized to issue bonds to the amount of \$10,000,000, and the proceeds thereof to be used for the purpose of financing the war.

Account with municipalities are divided by the Commission in the main as follows:

(a) Town Account Municipalities

(b) Town Account Municipalities in respect of the cost of power rendered from a generating station the Town Commission Act.

we can supply it in quantities of 100,000-1,000,000.

1922, the accounts going to make up the above balance had all been paid.

(b) Due by or to municipalities
in Respect of the Cost of Power

At the close of each fiscal year the interim power bills rendered monthly are adjusted to meet the operating costs of the system as provided by the Power Commission Act.

From an examination of the accounts to October 31st, 1921, it does not appear to be the practice of the municipalities to pay in cash these additional charges, but instead the Commission increases the interim rates in subsequent periods and thereby reduces the accumulated deficits of prior periods. **COPY**

Section 23a of the Power Commission Act provides that:

"The Commission may from time to time during the first three years after any municipality shall first begin to take power from the Commission extend the time for payment of the sums payable by any municipality."

At October 31st, 1921, the following amounts were owing by or to the municipalities in the Rideau System in respect of the cost of power:

Municipality	Balances	
	Debit	Credit
Carleton Place		\$ 808.58
Lanark		65.04
Perth	\$4,086.85	
Smith's Falls		2,632.06
Total	\$4,086.85	\$3,505.68

PW.
p.15

1911, the amount paid in the year 1911 was \$11,000.00

been paid.

(a) The amount of the year 1911 was \$11,000.00

In the year 1911 the amount paid was \$11,000.00

year 1911 the amount paid was \$11,000.00

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year 1911 the amount paid was \$11,000.00

year 1911

The Commission may from time to time during the year 1911 the amount paid was \$11,000.00

At October 1911, the amount paid was \$11,000.00

year 1911 the amount paid was \$11,000.00

year 1911 the amount paid was \$11,000.00

Year	Amount	Year	Amount
1911	\$11,000.00	1911	\$11,000.00
1912	\$11,000.00	1912	\$11,000.00
1913	\$11,000.00	1913	\$11,000.00
1914	\$11,000.00	1914	\$11,000.00
1915	\$11,000.00	1915	\$11,000.00
1916	\$11,000.00	1916	\$11,000.00
1917	\$11,000.00	1917	\$11,000.00
1918	\$11,000.00	1918	\$11,000.00
1919	\$11,000.00	1919	\$11,000.00
1920	\$11,000.00	1920	\$11,000.00

Results of Operation

Power is supplied to the municipalities on the Rideau System on a cost basis as outlined in the Power Commission Act. The cost of such power includes:-

1. Operating and maintenance expenses.
2. Interest on moneys invested in the works of the system.
3. Provision for the renewal of the works.
4. Sinking fund on a thirty year basis to repay the investment in the system. (Not yet provided for as the municipalities have not been in operation for a period of five years during which time sinking fund payments are deferred.)

The operating account of the system from the commencement of operations to October 31st, 1921, is as follows
(cents omitted):

P.W.
Ex.I.

Particulars	Month of October, 1918	Year ending October 31, 1919	1920	1921
Revenue from municipalities	\$494	\$27,351	\$65,523	\$89,014
Operating Expenses, Fixed Charges, etc:				
Power Purchased	-	\$ 9,366	\$ 6,705	\$ 5,077
Operating	\$211	1,382	5,074	8,368
Maintenance	64	859	5,132	2,511
Overhead & General Expense	38	3,202	6,330	6,111
Interest	181	8,119	29,368	47,216
Renewals	-	4,215	14,505	19,198
Sinking Fund	-	-	-	-
Contingencies	-	206	409	535
	\$494	\$27,351	\$65,523	\$89,014
Horse-power billed		630.6	1637.5	2131.7
Cost per horse-power billed		\$32.92	\$40.02	\$41.76

WJF.
D.27850

ANALYSIS OF INVESTMENT

Power is supplied to the municipality on the basis of a contract with the power company. The cost of such power includes:

1. Operating and maintenance expenses.
2. Interest on money invested in the plant of the system.
3. Provision for the renewal of the plant.
4. Sinking fund on a thirty year basis to repay the investment in the system. (Not yet provided for as the municipalities have not been in operation for a period of five years during which time sinking fund payments are required.)

The operating expenses of the system from the year of operation at approximately \$100,000 per year, is as follows:

COPY

Ex. 1
Ex. 2

Operating Expenses		Investment Expenses	
Year	Amount	Year	Amount
1955	\$100,000	1955	\$100,000
1956	\$100,000	1956	\$100,000
1957	\$100,000	1957	\$100,000
1958	\$100,000	1958	\$100,000
1959	\$100,000	1959	\$100,000
1960	\$100,000	1960	\$100,000
1961	\$100,000	1961	\$100,000
1962	\$100,000	1962	\$100,000
1963	\$100,000	1963	\$100,000
1964	\$100,000	1964	\$100,000
1965	\$100,000	1965	\$100,000
1966	\$100,000	1966	\$100,000
1967	\$100,000	1967	\$100,000
1968	\$100,000	1968	\$100,000
1969	\$100,000	1969	\$100,000
1970	\$100,000	1970	\$100,000
1971	\$100,000	1971	\$100,000
1972	\$100,000	1972	\$100,000
1973	\$100,000	1973	\$100,000
1974	\$100,000	1974	\$100,000
1975	\$100,000	1975	\$100,000
1976	\$100,000	1976	\$100,000
1977	\$100,000	1977	\$100,000
1978	\$100,000	1978	\$100,000
1979	\$100,000	1979	\$100,000
1980	\$100,000	1980	\$100,000
1981	\$100,000	1981	\$100,000
1982	\$100,000	1982	\$100,000
1983	\$100,000	1983	\$100,000
1984	\$100,000	1984	\$100,000
1985	\$100,000	1985	\$100,000
1986	\$100,000	1986	\$100,000
1987	\$100,000	1987	\$100,000
1988	\$100,000	1988	\$100,000
1989	\$100,000	1989	\$100,000
1990	\$100,000	1990	\$100,000
1991	\$100,000	1991	\$100,000
1992	\$100,000	1992	\$100,000
1993	\$100,000	1993	\$100,000
1994	\$100,000	1994	\$100,000
1995	\$100,000	1995	\$100,000
1996	\$100,000	1996	\$100,000
1997	\$100,000	1997	\$100,000
1998	\$100,000	1998	\$100,000
1999	\$100,000	1999	\$100,000
2000	\$100,000	2000	\$100,000

Power plant cost \$100,000
Cost per kilowatt-hour \$100,000

The operating accounts shown above are those stated in the published accounts of the Commission and do not include the adjustment made in respect of renewal charges in 1921, the effect of which is a reduction in the cost of slightly less than \$1.00 per horse-power in 1919 and approximately \$1.57 in 1920.

From the above it will be noted that the cost of power increased from approximately \$32.92 per horse-power in 1919 to \$41.76 in 1921 or about 26%.

The following table showing the details per horse-power billed indicates in what respects and to what extents the operating costs and fixed charges have varied:

COPY

	1919	1920	1921	
Power Purchased	\$11.27	\$ 4.10	\$ 2.38	
Operating Costs	1.67	3.10	3.93	
Maintenance	1.03	1.91	1.16	
Overhead and General Expense	3.86	3.86	2.86	VJF.
Interest	9.76	17.94	22.16	p.52
Renewals	5.00	6.86	9.00	
Sinking Fund	-	-	-	
Contingencies	.25	.25	.25	
T o t a l s	\$32.92	\$40.02	\$41.76	

Power is purchased from the Rideau Power Company, Limited, at \$14.00 per horse-power under the terms of a contract dated January 25th, 1918. The amount of power purchased during the period under review is by years as follows:

Year	Horse-Power Purchased	
1919	669	
1920	479	
1921	363	

P.W.
p.11

The following amounts were shown in the statement in the published statement of the Commission and in the statement of the Commission made in answer to a resolution adopted in 1911. The amount shown in the statement in the year of 1911 was \$1.00 per horse-power in 1911 and approximately \$1.00 in 1912. From the above it will be seen that the cost of power increased from approximately \$1.00 per horse-power in 1911 to \$1.10 in 1912 or about 10%.

The following table showing the details per horse-power billed indicates in what respects and to what extent the operating costs and fixed charges have varied.

		1911	1912	1913
Operating Costs	Interest on Bonds	\$1.00	\$1.00	\$1.00
	Interest on Notes	1.00	1.00	1.00
	Interest on Debentures	1.00	1.00	1.00
	Interest on Mortgage	1.00	1.00	1.00
	Interest on Other Loans	1.00	1.00	1.00
	Interest on Accounts Payable	1.00	1.00	1.00
	Interest on Other Liabilities	1.00	1.00	1.00
	Interest on Other Assets	1.00	1.00	1.00
	Interest on Other Income	1.00	1.00	1.00
	Interest on Other Expenses	1.00	1.00	1.00
Total		\$10.00	\$10.00	\$10.00

There is provided also the following statement of the Commission showing the details of the operating costs and fixed charges for the year 1913. The amount of power purchased for the year 1913 was \$1.10 per horse-power and the cost of power purchased for the year 1912 was \$1.00 per horse-power.

		1911	1912	1913
Operating Costs	Interest on Bonds	\$1.00	\$1.00	\$1.00
	Interest on Notes	1.00	1.00	1.00

The variations shown in the above table of costs are largely due to the decreased quantity of power purchased and the increased quantities produced by the Commission's power plants.

The revenue shown in the aforestated operating account includes the final power bills rendered the municipalities to adjust the interim rates to actual cost. The interim rates charged for power exceeded in the aggregate the actual cost thereof in the years 1919 and 1921 in the amounts of \$2,272 and \$1,468 respectively; while in the year 1920 they failed to meet actual cost in the amount of \$3,144.

The following is a statement of the estimates furnished the various municipalities by the Commission, showing the estimated load and estimated cost together with actual loads taken by the municipalities and the actual cost per horse-power:

Carleton Place

<u>Estimates</u>	<u>Estimated Load</u>	<u>Estimated Cost</u>
December 23, 1913	100 h.p.	\$48.84
January 8, 1919	200 h.p.	27.89 - 32.18
	No estimate	33.00
<u>Actual Load & Cost</u>	<u>Load</u>	<u>Cost</u>
Fiscal year 1919	246.8 h.p.	\$20.63
1920	616.8 h.p.	33.75
1921	730.0 h.p.	43.27
Average	531.2	36.08

The version shown in the above table is

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The above shown in the enclosed exhibits

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Collection for all of the following information is required:

There is a large amount of information in the literature on the effects of the environment on the development of the child. The environment is a complex of many factors, and the effects of these factors are often difficult to measure. The environment can be divided into physical and social environments. The physical environment includes factors such as air pollution, noise, and radiation. The social environment includes factors such as family, school, and community. The effects of the environment on the child can be both direct and indirect. Direct effects are those that are caused by the environment itself, while indirect effects are those that are caused by the environment through other factors. The effects of the environment on the child can be both positive and negative. A positive environment can promote the child's development, while a negative environment can hinder it. The effects of the environment on the child can be both short-term and long-term. Short-term effects are those that are caused by the environment in the immediate past, while long-term effects are those that are caused by the environment over a long period of time. The effects of the environment on the child can be both individual and collective. Individual effects are those that are caused by the environment for a single child, while collective effects are those that are caused by the environment for a group of children. The effects of the environment on the child can be both physical and psychological. Physical effects are those that are caused by the environment on the child's body, while psychological effects are those that are caused by the environment on the child's mind. The effects of the environment on the child can be both observable and unobservable. Observable effects are those that can be seen or measured, while unobservable effects are those that cannot be seen or measured. The effects of the environment on the child can be both controllable and uncontrollable. Controllable effects are those that can be changed or controlled, while uncontrollable effects are those that cannot be changed or controlled. The effects of the environment on the child can be both preventable and unavoidable. Preventable effects are those that can be avoided or prevented, while unavoidable effects are those that cannot be avoided or prevented. The effects of the environment on the child can be both reversible and irreversible. Reversible effects are those that can be reversed or undone, while irreversible effects are those that cannot be reversed or undone. The effects of the environment on the child can be both temporary and permanent. Temporary effects are those that are caused by the environment for a short period of time, while permanent effects are those that are caused by the environment for a long period of time. 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Approved and signed by the Board of Directors of the Company on this 10th day of May, 1964.

Yr 1991 avg. no. of publications 14.0 per Yr

Added to next actual cost in the amount of \$2,144.

THE OFFICE OF THE ATTORNEY GENERAL

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and the estimated loss and estimated cost reported with respect

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DATE	DESCRIPTION	AMOUNT	BALANCE
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Lanark

<u>Estimates</u>	<u>Estimated Load</u>	<u>Estimated Cost</u>
May 29th, 1920	50 h.p.	\$107.01
<u>Actual Load & Cost</u>	<u>Load</u>	<u>Cost</u>
1921	3.2 h.p.	\$73.13

Perth

No Estimates

<u>Actual Load & Cost</u>	<u>Load</u>	<u>Cost</u>
Fiscal year 1919	145.5 h.p.	\$55.15
1920	382.0 h.p.	44.99
1921	524.1 h.p.	43.77
Average	350.5 h.p.	45.74

Smith's Falls

<u>Estimates</u>	<u>Estimated Load</u>	<u>Estimated Cost</u>
September 6th, 1913	1,000 h.p.	\$57.26
	2,000 h.p.	26.01
December 23rd, 1915	500 h.p.	52.07
	1,000 h.p.	34.02
	2,000 h.p.	27.35
May 19th, 1916	1,500 h.p.	32.66 - 34.32
	2,000 h.p.	28.55 - 29.59
<u>Actual Load & Cost</u>	<u>Load</u>	<u>Cost</u>
Fiscal year 1919	585.9 h.p.	\$28.40
1920	586.7 h.p.	36.06
1921	674.4 h.p.	39.17
Average	615.7 h.p.	35.95

P.W.
Ex.I.

Year	Value	Year	Value
1957	10.000	1958	10.000
1959	10.000	1960	10.000
1961	10.000	1962	10.000
1963	10.000	1964	10.000
1965	10.000	1966	10.000
1967	10.000	1968	10.000
1969	10.000	1970	10.000
1971	10.000	1972	10.000
1973	10.000	1974	10.000
1975	10.000	1976	10.000
1977	10.000	1978	10.000
1979	10.000	1980	10.000
1981	10.000	1982	10.000
1983	10.000	1984	10.000
1985	10.000	1986	10.000
1987	10.000	1988	10.000
1989	10.000	1990	10.000
1991	10.000	1992	10.000
1993	10.000	1994	10.000
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1997	10.000	1998	10.000
1999	10.000	2000	10.000
2001	10.000	2002	10.000
2003	10.000	2004	10.000
2005	10.000	2006	10.000
2007	10.000	2008	10.000
2009	10.000	2010	10.000
2011	10.000	2012	10.000
2013	10.000	2014	10.000
2015	10.000	2016	10.000
2017	10.000	2018	10.000
2019	10.000	2020	10.000
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Up to October 31st, 1921, there were no rural lines served by the Rideau System.

POWER DATA

Population Served and Percentage of Consumers to Population

The district served by the Rideau System is urban only, there being no rural lines built to October 31st, 1922. The bulk of the load is carried by the various municipalities. Two of these are small, having population of less than 1,000 each.

WJF.
p.20

"Municipal Statistics" of the Province of Ontario for 1921 gives a total population of about 50,000 for those portions of the Counties of Lanark, Grenville, Leeds, Frontenac, Renfrew and Carleton, which are tributaries to the Rideau System. At October 31st, 1921, the total population in the four municipalities served by the system was about 14,800 persons, with about 3,200 consumers. As most of the towns tributary to the Rideau System are already supplied either by the Commission or by municipally owned plants or by privately owned plants, the greater part of the remainder can only be supplied by a fairly extensive system of rural lines. The four municipalities now served were billed with about 2,132 horse-power in 1921. During the first ten months of the fiscal year 1922 the power billed, including the added municipalities of Balderson and Kemptville, was about 2,118 horse-power.

This also includes the power supplied to the Grenville Rock Company during the last six months of the fiscal year. The billed power for 1923 will probably increase by 500 horse-power or more, made up largely of the load of the Grenville Rock Company. This company, it is understood, commenced to take power about April, 1922. The contract contemplates that 650 horse-power will be used, with possible additions in future. The normal growth of the system will doubtless require several hundred horse-power as well.

WJF.
p.20
& 21

The following table gives in detail the number of consumers at the end of the fiscal year 1921 in the places served by the Commission, the approximate horse-power billed to each place in 1921, and the average horse-power per consumer in 1921.

Table of Market Statistics

Consumer	Population	Number of Consumers	Percentage Consumers to Population	H.P. Billed in 1921	H.P. Billed per Consumer
Carleton Place	3,430	827	24.1	730.0	0.88
Lanark	625	107	17.1	3.2	0.03
Perth	3,630	803	22.1	524.1	0.65
Smith's Falls	6,665	1,431	21.5	874.4	0.61
Totals	14,350	3,168	22.5	2,131.7	

WJF.
p.21

The average horse-power billed per consumer in 1921 was 0.67, and the average horse-power billed per capita was 0.15 while the average ratio of consumers to population served is 22.5%

This also includes the power supplied to the city. The power supply for the last six months of the fiscal year, the billed power for 1931 will probably increase by 500 horse-power or more, made up largely by the load of the city. This company, it is understood, commenced to turn power about April, 1931. The company anticipates that the power will be used, with possible additions in future. The annual record of the power will be published in the report of the power company. The following table gives in detail the power at the end of the fiscal year 1931 in the city served by the company. The approximate horse-power billed in each place in 1931, and the average horse-power per acre, is as follows:

Table of Power Statistics

City	Power Billed	Power Billed	Power Billed	Power Billed
Seattle	1,400	1,400	1,400	1,400
Bellevue	1,400	1,400	1,400	1,400
Bothell	1,400	1,400	1,400	1,400
Edmonds	1,400	1,400	1,400	1,400
Everett	1,400	1,400	1,400	1,400
Frederick	1,400	1,400	1,400	1,400
Kenmore	1,400	1,400	1,400	1,400
Maple Valley	1,400	1,400	1,400	1,400
North Bend	1,400	1,400	1,400	1,400
Redmond	1,400	1,400	1,400	1,400
Shelton	1,400	1,400	1,400	1,400
Union	1,400	1,400	1,400	1,400
Washelli	1,400	1,400	1,400	1,400
West Seattle	1,400	1,400	1,400	1,400
White Center	1,400	1,400	1,400	1,400
Yakima	1,400	1,400	1,400	1,400

The average horse-power billed per acre in 1931 was 7.47, and the average horse-power billed per acre was 6.15 while the average ratio of increase in population served is 11.5.

Growth of Market and

Ultimate Sources of Power Supply

Since the commencement of operations of the Rideau System in September, 1918, the growth has been fairly steady except for a decrease of about 260 horse-power during 1921. The loads for the system are as follows, the figures being given in horse-power for the month of October in each year:

1918	414
1919	- 1306
1920	- 2304
1921	- 2043.5.

W.F.
p.22

These figures are the sum of the loads in October for the various municipalities, and do not show the actual peaks on the system, but they do indicate the growth of the demand.

The ultimate source of power supply for the Rideau System when all the available local plants will have been used to full capacity, or else discarded, is undoubtedly transmitted power from large plants contemplated at Carillon, Chate Falls and Bryson on the Ottawa River, or at the Chelsea and the Pagan sites on the Gatineau River, where large amounts of power aggregating several hundred thousand horse-power can be made available. The proposed development of the St. Lawrence River powers could doubtless provide all of the power necessary for the Rideau System, but it would probably be more economical to use the Ottawa and Gatineau River sites.

If the Rideau System and the Ottawa System be extended southwards and eastwards, and the St. Lawrence System

about 1971 in various places:

There is no doubt that the work of the Commission is of great importance and that it is a task which must be carried out with the utmost care and diligence. The Commission is composed of representatives of the various countries and it is essential that they should work together in a spirit of cooperation and understanding. The Commission's work is of great importance and it is a task which must be carried out with the utmost care and diligence.

176

419	---	8191
4081	---	8191
4082	---	8191
4083	---	8191

These figures are not to be taken as evidence of the
actual number of persons who are not shown the actual figures on
the ground, but as evidence of the number of persons who are not shown the actual figures on the ground.

There is a possibility that the information in this report is being used for purposes other than those for which it was intended. It is requested that you inform the Bureau if you become aware of such use.

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power can be made available. The proposed arrangement of

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be extended northwards, it is possible that in the future interconnecting lines may be constructed so that any of these systems might receive power either from the water powers on the St. Lawrence River or from the Ottawa and Gatineau Rivers.

The present indications are that the actual total amount of power required for the Rideau System will not reach the capacity of the various local generating stations and sites within the system for some years to come.

WJF.
p.22.

The problem of serving rural customers is difficult as the average number of consumers per mile is small, the experience of the Commission being that only three or four per mile on the average are obtainable.

The situation at the present time is that there is a shortage of power at High Falls and Merrickville, and that some of the small plants elsewhere have had to be put into service to supply the recent demand for power. The demands will undoubtedly increase and it is understood that applications are already before the Commission for a considerable mileage of new lines to serve rural districts. There are many small places in the district which do not yet receive power, from the Rideau System.

In certain centres, for example, at Almonte and Merrickville, the people are apparently satisfied to continue under their present private arrangements. From the table of

is extended westward, it is possible that in the future
interconnecting lines may be constructed so that any of
these systems might receive power either from the water
power on the St. Lawrence River or from the Ottawa and
Saguenay Rivers.

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The present limitations of the power system
may be overcome by the use of the Saguenay River and
the expansion of the existing lines connecting stations and
also within the system for some years to come.
The question of extending these systems is still
open as the present number of systems for this is small.
The expansion of the Saguenay River and the Saguenay
from the Saguenay River and Saguenay.

COPY

The situation at the present time is that there is
a shortage of power at High Falls and Saguenay, and that
some of the small plants elsewhere have had to be put into
service to supply the power. The situation
will undoubtedly continue and it is anticipated that appli-
cations are already being made for a considerable
amount of new lines to meet this situation. There are
many small plants in the Saguenay area but they produce
power from the Saguenay River.

In certain countries, for example, as Alaska and
Siberia, the people are apparently entitled to continue
under their present electric arrangements. From the table of

miscellaneous plants shown on page 17 of our Consulting Engineer's report on the system, and from the fact that large new privately owned power developments are contemplated within easy transmission distance, it is evident that a large capacity of private power plants could be made available to serve the whole of the easterly portion of Ontario in competition with the Commission. Alternatively, it is possible that some of these plants would consider selling large blocks of power to the Commission under wholesale conditions and allow the Commission to do the distribution without competition.

WJF.
p.23

COPY

interconnected plant units as well as the generating
 equipment of the system, and from the fact that
 large and relatively small power developments are con-
 sidered within any transmission distance, it is evident
 that a large capacity of private power plants could be
 made available to serve the whole of the country. It is
 also possible to consider the possibility of developing
 it, it is possible that some of these plants could be
 called large blocks of power to the domestic market
 and considered as a whole for the purpose of the distribu-

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S U M M A R Y

In the foregoing sections of this report comment has been introduced from time to time to make the various statements clear. No public hearing was held in reference to matters connected with this system, in consequence of which the report is based entirely upon facts and figures supplied in the official reports of the Accountants, Messrs. Price, Waterhouse and Company, and the Consulting Engineer, Mr. Walter J. Francis. In order to direct attention to the matters on which the Commission may desire to give particular attention hereunder is given a brief summary of the points which appear to require special consideration.

1. Capital Investment ("General Economics" p. 16-17)

The total capital investment as at October 31st, 1921, amounted to \$1,074,004. Of this amount \$756,285 represents investments in power developments at High Falls and Carleton Place, and the balance constitutes the Commission's investment in wood pole transmission lines and transformer stations. The capital assets contain little, if any, intangibles, as the amount of \$10,478.00 paid by the Commission for the undeveloped power site on the Mississippi River included also certain acreage at the site of development.

S U M M A R Y

In the foregoing sections of this report summary

has been presented from time to time in various

statements made, the public hearing was held in substance

in order to present this report, in substance of what

the report is a summary of the facts and figures reported

in the official reports of the Commission, dated 1934.

Commission and Company, and the Commission's report, Mr. Nelson

J. Nelson. In order to present this report to the public in

order to present this report to the public in

information is given in brief summary of the points which appear

in various special investigations.

1. General Summary (Summary Statement, p. 12-17)

The total capital investment as at October 31st, 1934,

amounted to \$1,014,000. It was made up of various

investments in power development as high class and various

types, and the balance represented the Commission's investment

in new gas transmission lines and transmission systems.

The capital assets owned by the Commission as at the end of

1934 were \$1,014,000 and the Commission has the following

assets on the Balance Sheet (which also contain

details of the size of development.

2. Capital Expenditures
exceed Estimates ("General Economics" - p.18)

When appropriation to cover the cost of the High Falls development was requested, the Chairman of the Commission advised the Premier as follows:

"The work contemplated consists of the complete development of the High Falls for 3000 horse-power, and 22 miles of high tension line to Perth at a total estimated cost of \$340,000."

The actual cost of this development at October 31st, 1931, is stated by our auditors to be \$695,414.00. Consequently it will be noted that the actual cost has exceeded the estimate by more than 100%. The Chief Engineer of the Commission has been requested to give details covering the cost of this work, but to date the information has not been given. When it is available a study will be made.

3. Expenditures
exceed Appropriations ("General Economics" - p.19)

An analysis of the advances made by the Province compared with the expenditures made by the Commission shows that in all, an amount of \$60,643.38 has been expended by the Commission over and above cash advanced to it for the purposes of the system by the Province. The funds to meet the expenditures made by the Commission in excess of the sums advanced by the Province were obtained from advances made for the purposes of other systems and it will be necessary for the Commission to obtain a further advance from the Province to cover this amount.

2. Capital Expenditures
General Information (General Information - p. 10)

When expenditures for capital expenditures are made, the amount of the expenditures is reported on the statement of the expenditures and the amount of the expenditures is reported on the statement of the expenditures.

The expenditures for capital expenditures are reported on the statement of the expenditures and the amount of the expenditures is reported on the statement of the expenditures.

The expenditures for capital expenditures are reported on the statement of the expenditures and the amount of the expenditures is reported on the statement of the expenditures.

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3. Expenditures
General Information (General Information - p. 10)

The expenditures for capital expenditures are reported on the statement of the expenditures and the amount of the expenditures is reported on the statement of the expenditures.

4. Reserve for Renewals ("General Economics" - p.20)

On the basis that the Commission sets aside a fund in respect of renewal reserve, our Consulting Engineer expresses the opinion that the total accumulations as of October 31st, 1921, were somewhat larger than necessary.

5. Reserve for Sinking Fund ("General Economics" - p.22)

The Commission has used its right under the Power Commission Act to defer collection of sinking fund during the first five years of operation. As no municipality on the system has been receiving electrical energy for a period of five years, no payments have yet been made in respect of sinking fund.

COPY

6. Reserve for Contingencies ("General Economics" - p.22)

Reserve for contingencies as of October 31st, 1921, amounted to only \$1,183.31. Our Consulting Engineer expresses the opinion that the reserve should be augmented by increasing the annual allowance until an amount of \$15,000 or \$20,000 will have been built up.

7. Accounts with Municipalities ("General Economics" - p.23-24)

The balance in power accounts receivable at October 31st, 1921, amounted to \$45,272.20. As at September 20th, 1922, the accounts going to make up this balance had all been paid.

The accumulated balances as of October 31st, 1921, over the whole period of operations show that there was a debit balance against the municipality of Perth in the amount

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1. *Explain the importance of the following factors in the development of a country's economy:*

Received for consideration, July 1, 1994

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Die Aufgabe ist die, die folgenden Aussagen zu bewerten:

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TABLE 1. "Unhappy" Letters: Satisfaction with the Program, by Age Group, Sex, and Education Level

THESE RESULTS ARE IN ACCORD WITH THE CONCLUSIONS OF OTHER STUDIES.

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Income out of money to pay salaries and other expenses

of \$4,088.85 and credit balances in respect of Carleton Place, Lanark and Smith's Falls totalling \$3,805.68. Perth had not been in operation for the full period of three years as at October 31st, 1921, and the Commission, therefore, have the right under the Act to defer payment of this debit balance.

6. Results of Operation ("General Economics" - p. 25)

The cost of power in the system increased from approximately \$32.92 per horse-power in 1919 to \$41.76 in 1921, or an increase of about 26%. The major part of this increase occurred in 1920 when the High Falls development plant came into operation. Previous to this time the requirements of the system had been supplied by the purchase of power, the cost of which in 1919 was \$11.27 per horse-power delivered to the Commission, the balance of the cost being made up of operating and fixed charges. In 1920 and 1921 the power purchased only represented \$4.10 and \$2.38 per horse-power respectively of the cost of power delivered to the municipalities. Interest on the investment on the High Falls plant represented \$17.34 and \$22.16 per horse-power respectively, the balances being made up of operating and fixed charges.

9. Comparison of Estimated Power Costs with Actual Power Costs ("General Economics" p.27-8)

The figures that we have been able to obtain make it difficult to compare year by year actual power costs with estimated costs, but from the information submitted by our

Accountants, it would appear that the Commission in a general way have kept well within the estimates which they originally submitted to the municipalities.

That the actual costs are less than the estimated costs is a condition which has not generally prevailed in the smaller systems which have been investigated up to the present time, and the condition prevailing in the Rideau System in this respect is still more striking when it is noted that, in many cases, the actual loads taken by the municipalities have been considerably less than the loads originally estimated upon.

10. Future Sources of Power ("General Economics" - p.31)

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Generally speaking the growth of power consumption in the system has been fairly steady, the amount taken in 1918 being 414 horse-power, and in 1921, 2,044 horse-power. It will be necessary for the Commission within the course of a few years to obtain power from some other source, and unless the development of the St. Lawrence River for power purposes is available at that time, it would appear that the most logical source of supply is by the purchase of power from large plants which are contemplated at Carillon, Chats Falls and Bryson on the Ottawa River, or at the Chelsea and the Pagan sites on the Gatineau River. These will be large and relatively inexpensive developments, and it would appear that the Commission should carefully investigate the purchasing of power from these plants before installing any works of their own which would entail comparatively high development costs.

A D D E N D A

It has recently been brought to our attention that the Commission has made substantial reductions in the renewal rates charged in various systems and that such reductions have been made retroactive to the date of first operation.

Memorandum re Reduction of Renewal Rates
on the Rideau System

On December 20th, 1922, the Commission passed the following Minute reducing the renewal rates on the Rideau System:

"The Chief Engineer having recommended a revised depreciation rate, calculated on the basis of the life of the equipment, also having advised that this matter had been taken up with Mr. Francis and approved, it was decided that the depreciation rate for Rideau System should be fixed at 1.0%, and that this rate be made retroactive to date of first operation."

The rate used by the Commission was 1.85 per cent. and this revision has resulted in a reduction of the rate of .85 per cent.

We have been informed by Mr. McPherson, in charge of Hydro accounts in the absence of Mr. Pierdon, that the effect of this revision has resulted in a reduction of the renewal reserve of \$16,242.07, of which \$15,609.52 has been applied as a credit to the municipalities and \$632.55 as a

credit to the Rideau Power Development. The amount of \$15,609.54 credited to the municipalities has the effect of reducing the cost of power to them throughout the entire period of operation to October 31st, 1921, and would reduce the balances owing by them at that date in corresponding amounts.

The operating figures in this report are also subject to revision, especially the annual cost per horsepower.

In view of the instructions given no attempt has been made to recast the figures in order that they may conform with the changes recently made, but it is pointed out that in reporting to the Government some reference should be made to the reduction that has been made in the renewal reserve account.

credit to the Illinois State Department. The amount of \$12,500.00 credited to the Commissioner's account for the year ending the year of 1954 is shown in their statement. The entire credit of \$12,500.00 on October 15, 1954, and would reduce the balance owing by them at that date in investigating accounts.

The operating figures in this report are also subject to revision, especially the annual and per capita figures.

In view of the investigation given on at least the same date as the investigation in order that they may obtain with the same results. It is believed that it is possible to the Department from various sources that it is possible that the same date in the various reports.

The following information is being furnished to you for your information and use. It is requested that you keep this information confidential and not discuss it with anyone else. The information is being furnished to you for your information and use only.

